STRESS FRACTURES IN ATHLETES – A STUDY OF 282 CASES

Dr. Kishore Jebasingh* | Dr. Jagatheesan Alagesan | Dr. Abdulla Al Blooshi*****

**Research. Scholar, Himalayan University, Itanagar, Arunachal Pradesh, India.*

***Assistant Professor, College of Health Sciences, Gulf Medical University, Ajman, UAE and Research Supervisor, Himalayan University, Itanagar, Arunachal Pradesh, India.*

**** Assistant Director of Medical Affairs, Khorfakkan Hospital, Sharjah, UAE.*

DOI: http://doi.org/10.47211/tg.2021.v08i04.010

ABSTRACT

Stress fractures is a serious condition that can affect training and overall performance of a sports person. Stress fracture is incomplete fracture and one of the serious overuse injuries. Every year lots of patients are coming with tibial and ankle injury for the treatment. Most of these cases are misdiagnosed and frequently reinjured followed by the recurrent treatment for the same complaint. As a clinician it is most important to find out the cause for large quantity of patients getting recurrence of overuse injuries. Especially to prevent stress fracture related injuries among sports people it is so necessary to find out and identify how many sports people are affected by stress fracture injuries.

The purpose of this study is to find the total quantity of sports person among total number of patients with stress fracture in khorfakkan hospital.

The subjects in this study were patients with overuse injuries and traction apophysitis directly reporting to the Orthopedic-Clinic and Emergency Room between the age group of 15-50 years. Emergency room physician or orthopedic surgeon take the history of injury and thoroughly examined and send to radiography department for X – ray, if fracture is not revealed through X – Ray patients will be referred to MRI. If the fracture is revealed through X – Ray or MRI scan, then patients will be included in the study. In this study total 282 sports related injuries from minor-to-moderate traumatic injuries consecutively enrolled over 24 consecutive months in khorfakkan hospital ER and orthopedic department

From this study total 234 sporting injuries/minor-to-moderate traumatic injuries were revealed hairline fracture the mean ± standard deviation age was 27.5 ± 7 years. From these 234 cases 188 cases were sports person respectively 180 males and 8 females. This study concludes that proper training and wearing proper footwear by the players can prevent the bone and muscle related injuries.

Key Words: Sports person, fracture, footwear, players.

ABOUT AUTHORS:

Author Dr. Kishore Jebasingh is Research Scholar in Himalayan University, Itanagar, Arunachal Pradesh, India. He has attended various Seminars and conferences.

Author Dr. Jagatheesan Alagesan is Assistant Professor, College of Health Sciences, Gulf Medical University, Ajman, UAE and Research Supervisor, Himalayan University, Itanagar, Arunachal Pradesh, India.

Author Dr. Abdulla Al Blooshi is Assistant Director of Medical Affairs, Khorfakkan Hospital, Sharjah, UAE.

INTRODUCTION

Stress fractures (SF) are one of the most common and potentially serious overuse injuries, it means incomplete fractures in bone, caused by repetitive forces. Stress fractures are more common in athletes and military recruits, gymnasts, dancers, tennis players, football players and basket-ball players engaging in high impact activities[1,2,3.] This fracture mainly associated with heavy training, stress fractures can be mimicked by injuries to the muscles, tendons, ligaments and other fractures[1,2,3]. Also stress fractures is the most common problem in football players and athletes due to improper training mainly in lower extremities. Many factors contribute to these problems including improper training, lack of awareness, incorrect foot wearing, missed diagnosis.

The physiological response of bone to loading is well understood but mechanisms for stress fracture development remain unclear. Healthy bone undergoes a remodeling process following optimal levels of loading[5] with prolonged bone strain making the bone stiffer and denser, and consequently stronger[6]. When the bone is loaded, electrical signals activate osteoclasts and osteoblasts. These are cells within bone tissue, each with a specific role in bone remodeling. This remodeling process occurs according to Wolff's Law[7]. which states that with increased loading, the bone remodels over time in order to be able to withstand that greater level of loading in the future.

However, it is consistently reported that repeated bone strain at a level below the failure threshold may result in microdamage development[8]. Accumulated microdamage as a result of repetitive loading, with insufficient opportunity for remodeling, will eventually result in bone failure. A number of factors influence microdamage progression including high stress magnitude, high strain rates, high number of loading cycles and frequency, and low bone density[9].

It is well established that sports training programmes have high rates of lower limb injury occurrence. Training must be designed to elicit beneficial adaptations, which can be achieved through physiological stress above normal levels, according to the overload principle[10]. In order to physiologically stress the body, training variables such as intensity, frequency and duration can be increased[11]. High volumes of weight-bearing activity and sudden increases in training volume[12] have been associated with increased injury risk in sports populations.

Muscles are important contributors of force to joint moments and this may increase quadriceps and gastrocnemius muscle activity observed with increased load increasing loads during training of football player increased activity of the tibialis anterior, peroneus longus, medial and lateral gastrocnemius, biceps femoris and rectus femoris muscles[13]. These increases muscle activity may have been affect the performance and get overuse injury.

The pathomechanics of a tibial stress fracture can be explained via Bone Remodelling Concept. The repetitive submaximal loading to the tibia, such as running, which causes stress to the bone, the stress disrupts the osteocytes which causes bone fatigue, micro damage and eventually cell apoptosis. Osteoclasts arrive to the site of injury and remove the dead bone cells. This results in a temporary negative bone space and a reduction in bone structural integrity. Within the first few weeks, osteoblast recruitment occurs in the remodeling space and demineralized bone is formed in the cavity. At this point, only 65-70% of the matrix is completely mineralized and mechanical stiffness is not completely restored. From here, there are two fates of the bone: either the bone is fully mineralized, which can take up to a year to complete, or the submaximal loading continues. If the loading persists, over time the microcracks can become microfractures and eventually a true fracture.

Stress fractures is a serious condition that can affect training and overall performance of a sports person.

Ankle inversion injuries are considered in addition due to their high reported incidence in football players and the high risk of recurrence following an initial inversion injury. Injuries are undoubtedly a multifactorial problem, influenced by intrinsic and extrinsic variables[4]

OBJECTIVES:

The purpose of this study is to identify total quantity of sports person among total number of people with stress fracture in khorfakkan hospital.

METHODS

The subjects in this study were patients with overuse injuries and traction apophysitis directly reporting to the Orthopedic-Clinic or Emergency Room between the age group of 15-50 years. Emergency room physician or orthopedic surgeon take the history of injury and thoroughly examined and send to radiography department for X – ray, if fracture is not revealed through X – Ray patients will be referred for the MRI. If the fracture is revealed through X – Ray or MRI scan then those patients will be included in the study.

RESULTS AND DISCUSSION

In this study total 282 sports related injuries from minor-to-moderate traumatic injuries consecutively enrolled over 24 consecutive months in khorfakkan hospital ER and orthopedic department. In this 282 comprised 239 males/43 females. From these 282 cases 48 cases declined CT/MRI for various reasons. Final study sample of

234 subjects were revealed hairline fracture respectively the mean ± standard deviation age was 27.5 ± 7 years. From these 234 cases 188 cases were sports person respectively 180 males and 8 females. In this 188 cases majority of the cases ankle injury. From these 188 cases 172 subjects are football players. Mainly hairline fractures revealed were in lateral and medial malleolus. From these studies we understood peoples are unaware about proper training and wearing proper footwear.

CONCLUSION

Proper identification mainly how many people affected from the same problem within same community is very important to plan the management and prevention of the stress fracture. Gait changes during walking with additional load compared with unloaded walking have been identified but it remains unclear how gait changes which result from the completion of prolonged load carriage activities influence lower limb injury risk. From these studies found that most of the injuries were occurred due to improper training, lack of awareness, incorrect foot wear and missed diagnosis of previous injuries. So concluding the proper diagnosis, the proper training and proper footwear for the players can prevent the bone and muscle injuries.

REFERENCES:

1. David L Helfet, David S Wellman et al, Tension Band Plating for Chronic Anterior Tibial Stress Fractures in High-Performance Athletes. Am J Sports Med, published online. SM PreView, 2015, 31 March.
2. Daniel S. Moran, Rachel K Evans, Eran Hadad. Imaging of Lower Extremity Stress Fracture Injuries. Sports Medicine. 38(4): 345-356, 2008 April.
3. Fuller CW, Bahr R, Dick RW, et al. A framework for recording recurrences, re-injuries, and exacerbations in injury surveillance. Clin J Sport Med. 17:197-200, 2007.
4. Murphy, D., Connolly, D., & Beynnon, B. (2003). Risk factors for lower extremity injury: a review of the literature. British Journal of Sports Medicine, 37(1), 13
5. Beck, B. R. (2000). Stress Fractures ACSM Current Comment. Michigan: ACSM.
6. Cowin, S., & Hegedus, D. (1976). Bone remodeling I: theory of adaptive elasticity. Journal of Elasticity, 6(3), 313-326.
7. Frost, H. M. (1994). Wolff's Law and bone's structural adaptations to mechanical usage: an overview for clinicians. The Angle Orthodontist, 64(3), 175-188.
8. Brukner, P., Bennel, K., & Matheson, G. (1999). Stress fractures: John Wiley & Sons.
9. Bennell, K., Malcolm, S., Wark, J., & Brukner, P. (1996). Models for the pathogenesis of stress fractures in athletes. British Journal of Sports Medicine, 30(3), 200-204.
10. Dick, F. W. (2007). Sports Training Principles (5th ed.). London: A & C Black.
11. Clark, M. L., S.; National Academy of Sports Medicine. (2009). NASM Essentials of Sports Performance Training: Lippincott Williams & Wilkins.
12. Bullock, S. H., Jones, B. H., Gilchrist, J., & Marshall, S. W. (2010). Prevention of physical training-related injuries: recommendations for the military and other active populations based on expedited systematic reviews. American Journal of Preventive Medicine, 38(1), S156-S181.
13. Robertson, G., Caldwell, G., Hamill, J., Kamen, G., & Whittlesey, S. (2013). Musculoskeletal Modelling Research Methods in Biomechanics, 2nd Edition (pp. 247-275). Champaign, IL: Human Kinetics.